31 May 2002

2001-2002 Learning and Assessment Report
School of Informatics
June 2002

Informatics is the systematic study of scientific, technical, aesthetic, and organizational aspects of computerization, especially how relevant *data* are managed and informed *decisions* are made, usually with reference to a specific applied discipline (for example, Chemical Informatics or Media Informatics). **Informatics** is a catalyst for discovery of new principles to ***inform*** our understanding of the world, development of new approaches that ***transform*** our abilities in the world, and delivery of needed progress to ***perform*** among the best in the world.[1]

I. Introduction

The Indiana University School of Informatics (SOI), established in 2000, educates students in the fundamental knowledge of applied information concepts and related information technology contexts. SOI faculty and staff [2] are fully committed to this principal goal, as demonstrated within the established program[3] that offers plans of study for an Associate degree, two baccalaureate degrees, two certificates, a minor, and five Master of Science degrees. Within a broadly based educational curricular format, each student can acquire the strategic concepts and tactical applications needed to achieve personal and professional growth in the dynamic and diverse domains of the School of Informatics, all in direct alignment with the ***IUPUI Mission*** and the ***IUPUI Statement of Values***[4].

The Informatics Program (INFO) and the New Media Program (NEWM) of the School of Informatics each provides a foundation for intellectual development and promotes an ability and desire to make contributions to society. Students become well-informed, effective citizens, actively participating in civic and community affairs; cultivating self-awareness; appreciating the humanities and pursuing life-long learning. The School has developed new programs and initiatives responding to societal needs, student demands, advances in research and knowledge as well as application. In this regard, the School leads learners by explicit example in the exploration and execution of the ***IUPUI Principles of Undergraduate and Life Long Learning***[5] (PUL's, PUL^3's).

Graduates of the Informatics Program and of the New Media Program face the complex and changing needs of the job market. This drives the dynamic direction of the School's learning objectives and programs within which each student can acquire the strategic concepts and tactical applications needed to achieve personal and professional growth in the dynamic and diverse domains of the School of Informatics.

II. Student Learning Objectives

Each successful student will acquire the strategic concepts and tactical applications needed to achieve personal and professional growth in general, among the dynamic and diverse domains of the School of Informatics; and specifically within the focus area chosen by the student and approved by the School.

Demonstration and evaluation of student success may be accomplished within the general framework of the IUPUI Principles of Undergraduate and Life Long Learning, as interpreted and extended for a specific focus area and/or degree plan of study.

---

[1] http://www.iupui.edu/news/insider102201.htm Oct.2001 public groundbreaking ceremony for CTC/IC bldg.
[2] http://informatics.iupui.edu/people/index.shtml plus http://www.newmedia.iupui.edu/fac_staff/index.php
[3] http://informatics.iupui.edu/degrees/index.shtm or http://www.newmedia.iupui.edu/curriculum/index.shtml
[4] http://www.iupui.edu/misc/mission.htm or http://www.planning.iupui.edu/mission/missionvalue.pdf
[5] http://www.universitycollege.iupui.edu//UL/Principles.htm (extended with "Life Long" for Graduates)

A) Based upon IUPUI Principles of Undergraduate and Life Long Learning

1) Core Communication and Quantitative Skills

To write, read, speak, and listen, perform quantitative analysis, and use information resources and technology and the foundation skills necessary for all IUPUI students to succeed. Students can:

a. express ideas and facts to others effectively in a variety of written formats;

form:	*practical reports and reviews, essay assignments and examination questions*
objective:	*improve efficiency of creating effective written (non-interactive) communication*
strategies:	*case studies, personal statements, product/service review*
evaluation:	*situation-specific effectiveness evaluation and holistic rubrics*
improvements:	*recognition of ongoing need for improved written communication*

b. comprehend, interpret, and analyze texts;

form:	*current awareness and other reading assignments, problem-solving classroom discussions*
objective:	*determine characteristics, evaluate performance, understand abstract concepts and application contexts*
strategies:	*read, determine statement of the problem, understand approaches to solution, select a solution, implement, review, revise, report*
evaluation:	*report evaluation according to criteria*
improvements:	*impact when "the whole is greater than the sum of the parts"*

c. communicate orally in one-on-one and group settings;

form:	*oral presentation*
objective:	*improve efficiency of creating effective oral communication*
strategies:	*planned presentations and extemporaneous class discussions*
evaluation:	*situation-specific effectiveness evaluation and holistioc rubrics*
improvements:	*recognition of ongoing need for improved oral communication*

d. solve problems that are quantitative in nature, and

form:	*modeling; problem-solving, project management, and related activities*
objective:	*construct and use models of physical systems*
strategies:	*balance quantitative and qualitative aspects of problem-solving*
evaluation:	*model evaluation according to criteria*
improvements:	*quantitative applications of relevant data*

e. make efficient use of information resources and technology for personal and professional needs.

form:	*Electronic library, CD, and Internet-based information search and retrieval; computer-based presentations; integrated use of e-mail, OnCourse, etc.*
objective:	*effective use of personal computer productivity applications*
strategies:	*leverage existing technology aids, tutorials, assistance, and computer labs*
evaluation:	*reports and presentation in course; student and alumni reports post-course*
improvements:	*reduce remedial tangents in classes with "Prerequisite: computer literacy"*

2) Critical Thinking

To analyze information and ideas carefully and logically from multiple perspectives. Students can:

- ❑ analyze complex issues and make informed decisions;
- ❑ synthesize information in order to arrive at reasoned conclusions;
- ❑ evaluate the logic, validity, and relevance of data;
- ❑ solve challenging problems, and;
- ❑ use knowledge and understanding in order to generate and explore new questions.

form:	*diverse teaching styles fully leveraging the experience of the instructor(s)*
objective:	*challenge student to find alternate solutions which really solve the problem*
strategies:	*integrate Myers-Briggs Personality Indicator, Bloom's Taxonomy of Learning Domains, Perry's Scale for Intellectual and Ethical Development*
evaluation:	*instructor, committee (example: Does the student surprise the instructor?)*
improvements:	*recognition that the question may be more of a block than a answer is.*

3) Integration and Application of Knowledge

To use information and concepts from studies in multiple disciplines in their intellectual, professional, and community lives. Students can apply knowledge to:

- enhance their personal lives;
- meet professional standards and competencies, and;
- further the goals of society.

form:	*problem-solving projects and examinations, capstone experience*
objective:	*demonstrate ability to have an applied impact based upon acquired knowledge*
strategies:	*"real world" employment context activities*
evaluation:	*review by instructor or advisory group*
improvements:	*emphasis on post-graduate successful employment and/or advancement*

4) Intellectual Depth, Breadth, and Adaptiveness

To examine and organize disciplinary ways of knowing and to apply them to specific issues and problems.

- Intellectual depth describes the demonstration of substantial knowledge and understanding of at least one field of study.
- Intellectual breadth is demonstrated by the ability to compare and contrast approaches to knowledge in different disciplines.
- Adaptiveness is demonstrated by the ability to modify one's approach to an issue or problem based on the contexts and requirements of particular situations.

form:	*foster multi-disciplinary and inter-disciplinary endeavors, change management*
objective:	*balance focus on tactical depth with peripheral vision of strategic breadth*
strategies:	*electives, projects, capstones, certificates, cognate areas, minor areas*
evaluation:	*review by instructor or advisory group*
improvements:	*As Walt Disney said, "Change is inevitable; Growth is optional."*

5) Understanding Society and Culture

To recognize their own cultural traditions and to understand and appreciate the diversity of the human experience, both within the United States and internationally. Students can:

- compare and contrast the range of diversity and universality in human history, societies, and ways of life;
- analyze and understand the interconnectedness of global and local concerns, and;
- operate with civility in a complex social world.

form:	*examine subjective concepts of specific computerization contexts in course*
objective:	*balance objective aspects with generally more-complex subjective aspects*
strategies:	*organizational change management approaches*
evaluation:	*exams and projects*
improvements:	*increased likelihood of operational success*

6) Values and Ethics

To make judgments with respect to individual conduct, citizenship, and aesthetics. Students can:

- make informed and principled choices regarding conflicting situations in their personal and public lives and to foresee the consequences of these choices, and;
- recognize the importance of aesthetics in their personal lives and to society.

form:	*examine professional practice, personal privacy and intellectual property protection*
objective:	*recognize competing and conflicting forces coincident with computerization*
strategies:	*review of relevant regulations, legislation, and professional best practices*
evaluation:	*exams and projects (use of quotation and citation, etc.)*
improvements:	*increased credibility for student, school, profession*

B) Additional SOI Professional Portfolio and Core Competencies

SOI professional core competencies extend from the Principles of Undergraduate and Life Long Learning, permeate degree plans of study and culminate in capstone coursework products and professional portfolios.

- relevant information acquisition & analysis for informed decision/algorithm design & development
- consensus, group and individual accountability and professionalism
- implementation acceleration and organizational change management

All students are encouraged to engage in independent study and/or research with a faculty mentor.

All candidates for the Bachelor of Science degree must complete a capstone experience project or thesis that is juried by the faculty.

Many students take advantage of the internships or cooperatives in order to receive "real world" experience.

Students who are provisionally admitted to a program are permitted to enroll in boot camp remediation courses that are offered outside the academic schedule. The school has authorized some students to contract with other IUPUI academic or administrative units and/or external organizations to complete work related to information technology, graphic design, programming, animation and video/audio editing.

C. Additional Degree Program or Area of Specialization Outcomes

Professional outcomes may be further extended within a specific degree program or area of specialization.

1) Courses (Also) Serving Non-SOI-Majors

Service courses are designed to provide informatics knowledge and skills in a general education context for students not completing a plan of study with the School. The Minor and Certificate Programs are traditional examples. In addition, there is recognition that "Introduction" courses, which may satisfy a "general education" or "minor" requirement in a plan of study in another school, may represent a "first and only" chance to engage students in the issues and subtleties of the School of Informatics domains of study.

Currently, there are no additional professional and student learning outcomes from the service courses, and the previous sections (II A. and II B.) may be applied with diminished rigor due to the decreased contact of non-degree contexts.

a) Certificate in Internet Application Development (NEWM)

Students who earn the certificate demonstrate that they have the core competencies necessary for entry-level positions in media informatics job roles.

The Certificate program in Internet Application Development serves students seeking a comprehensive skill set in Internet development and essential applications. The certificate provides a coherent program of study to support Internet and World Wide Web interaction. This certificate also provides a student's current or prospective employer with evidence of that student's acquisition of Internet and web-based development skills. Such training is of interest to students in a wide variety of fields. An Internet application development certificate also attracts degreed professionals currently working in careers requiring Internet support who have no formal credentials in Internet application development. A certificate at the end of twenty-seven hours additionally provides certificate holders with the coursework that could be applied toward established degree programs in new media. *Certificate Requirements:* 24 hours of required core courses in Art and Design, Journalism, Music, Computer Science, Computer Technology; and 3 additional hours of electives or internships.[6]

[6] http://www.newmedia.iupui.edu/curriculum/degrees.php?s=cert

b) Undergraduate Certificate in Informatics (INFO)

Students who earn the certificate demonstrate that they have the core competencies necessary for entry-level positions in informatics job roles.

The Certificate program in Internet Application Development serves students seeking a comprehensive Undergraduate Certificate in Informatics. The undergraduate Certificate in Informatics requires 26 credit hours of required core courses in Informatics; and an additional course (3 credits) from the Informatics curriculum. The additional courses can be chosen from the listed electives for Informatics and can therefore be taken in another department.[7]

c) Undergraduate Minor in Informatics (INFO)

Students who earn the undergraduate minor demonstrate that they have the core competencies necessary for leveraging informatics in the context of entry-level positions in their major domain.

The undergraduate Minor in Informatics requires students to take three lower division Informatics courses and two upper division Informatics courses from the approved list of choices, plus one course from the list of approved informatics electives. A minimum grade of 2.0 (C) is required in all courses taken for the minor. [8]

2) The A.S. Degree

Currently, there are no additional professional and student learning outcomes from the Associate degree plan of study, and the previous sections (II A. and II B.) may be applied with diminished rigor due to the decreased contact of Associate degree contexts.

A.S. in Media Arts and Technology

The Associate of Science in Media Arts and Technology degree is focused on developing skills and knowledge in new media in the primary areas of Internet design and multimedia programming. Even though new media is an emerging professional field, the degree is based in the traditional arts and sciences. Focused on applied research and application, the associate degree is oriented toward professional practice and relies on a theory base drawn from fundamental disciplines that study communication as sight, sound and motion.[9]

3) The B.S. Degrees

The additional elaboration on professional and student-learning outcomes from the baccalaureate degree plans of study includes skills and knowledge listed below. The previous sections (II A. and II B.) may be applied with full rigor.

a) B.S. in Informatics

The Bachelor of Science in Informatics degree develops skills and knowledge in information concepts and related information technology contexts with the purpose of preparing students to design, develop, and deploy processes involving computerization for acquiring and managing relevant data in making informed decisions. Focused on applied research and application, the degree is oriented toward professional practice and relies on a theory base drawn from fundamental disciplines which have application to informatics

Skills and knowledge embedded in this degree program include: technical understanding of how computing systems operate, ability to adapt/assess and apply new trends in IT, well-developed problem-solving skills, ability to work in teams such as those formed for the senior capstone project, well-developed communications skills to clearly convey solutions and observations to others, and understanding of social and ethical principles as they relate to IT issues. These valuable skills can be transported to a number of job settings.

---

[7] http://informatics.iupui.edu/degrees/minors.shtml
[8] http://informatics.iupui.edu/degrees/minors.shtml
[9] http://www.newmedia.iupui.edu/curriculum/degrees.php?s=asso

b) B.S. in Media Arts and Science

The Bachelor of Science in Media Arts and Science degree develops skills and knowledge in new media with the purpose of preparing students to manage and coordinate Internet and web operations and multimedia production and development. Focused on applied research and application, the degree is oriented toward professional practice and relies on a theory base drawn from fundamental disciplines that study communication as sight, sound and motion.

Skills and knowledge embedded in this degree program include: web page and multimedia design coordination, web-based computer programming, multimedia authoring language skills, multimedia implementation of audio and video materials, digital graphics (photography, scanning), and the writing and editing of materials for multimedia story boarding and content. Students will be able to develop a web site from scratch with full knowledge of all elements required for development, operational support and security; develop programs in languages on multiple computer platforms; prepare and present a major project with full industry-standard documentation; plan projects; allocate and budget resources; and practice with an understanding of ethical, legal and regulatory considerations. [10]

Four Areas of Specialization are recognized: 1) New Media Core (NMC), 2) Interactive Media and Usability (IMU), 3. Spatial Media and Gaming (SMG), and 4) New Media Management (NMM).

4) The M.S. Degrees

Currently, there are no additional professional and student-learning outcomes specifically articulated for the masters degree plans of study; the previous sections (II A. and II B.) may be applied with full rigor.

a) M.S. in Bioinformatics
b) M.S. in Chemical Informatics
c) M.S. in Health Informatics
d) M.S. in Human-Computer Interaction
and
e) M.S. in Media Arts and Science

[10] http://www.newmedia.iupui.edu/curriculum/degrees.php?s=bach

Indiana University School of Informatics - New Media Program - IUPUI

Bachelor of Science in Media Arts & Science - with Interface Usability Emphasis

NEW MEDIA CORE & USABILITY FOCUS

FOUNDATION

New Media Core 21 Credit Hours

- Intro to Digital Media Principles N100
- Intro. to Web Design N241
- Topics in Interactive Multimedia N101
- New Media Capstone, Portfolio N499
- Visualizing Information N110
- English Comp. I W131
- Fund. Computer Science Concepts N301

Courses w/ Interface Usability Component

General Usability Application

N101 Topics in Interactive Multimedia
N110 Visualizing Information
N100 Introduction to Digital Media Principles
N304 Interactive Media Applications

Usability Emphasis

N100 Introduction to Digial Media Principles
N450 Usability Principles for New Media Interfaces
N475 Research in Design Methods

Programming Usability Application

N331 Visual Basic
N341 Web Programming
N345 Advanced Java
N351 Multimedia Programming

NEW MEDIA CONCENTRATION - Digital Arts Specialization

APPRENTICE

Computer Programming Core

- Introduction to multimedia programming
- Visual basic programming
- VRML
- Web Programming
- Java
- C Language

Multimedia / Hypermedia Specialization

N215 On-Line Document Development
N300 Digital Media Production
N302 Media Simulation Methods
N304 Interactive Media Applications
N311 Digital Paradigm Shift: Effects in International Cultures and Society
N315 On-Line Document Development II
N420 Multimedia Project Development
N485 Usability Principles for New Media Interfaces

3D Animation Specialization

N235 Introduction to Computer Simulation/Animation
N240 Introduction to Digital Video
N330 Game Design, Development, and Production
N335 Computer-Based Character Simulation/Animation II
N340 Digital Video Production
N400 Imaging and Digital Media Seminar
N435 Computer Simulation/Animation III Production
N440 DV and CGI Special Effects

Degree Requirements - 122 Total Credit Hrs.

18 Hours - New Media core courses
24 Hours - New Media concentration courses (12 hours new media electives)
9 Hours - New Media web-based computer programming
59 Hours - New Media general university education
12 Hours - New Media university electives

General University Education

General Introductory Courses

N175 Digital Media I: Vector Imaging
N180 Digital Media II: Raster
N200 Desktop Tools for Digital Media
N201 Design Issues in Digital Media
N204 Introduction to Interactive Media
N210 Introduction to Digital Sound
N230 Introduction to Game Design and Development
N250 Team Building in Technology
N295 Career Enrichment Cooperative

SENIOR LEVEL

MASTERY

- N475 Research in Design Methods
- N485 Seminar in New Media
- N495 Enrichment Internship

General Advanced Courses

N400 Imaging and Digital Media Seminar
N410 History and Theory of Digital Media
I310 Multimedia Arts: History, Criticism, and Technology

August 2001

III. Assessment Activities

The New Media Program and the Informatics Program both are very new, and what data exists cannot show trends with statistical significance. (The first IUPUI Informatics baccalaureate degree was granted only last month, May 2002.) Nonetheless, supplemental strategies include assessing the numbers of degrees conferred, and the rates of retention and graduation. In addition, surveys are used to assess how well students believe they have learned the course outcomes. No comprehensive exit interview is made.

Both programs assume and expect that the vast majority of their graduates will seek employment or advancement in lieu of additional academic experience. Thus, employment or advancement success and employer satisfaction are supplemental strategies for assessment.

And, both programs target job roles that may involve professional organization affiliation yet do not require professional accreditation or regulatory certification (currently); therefore, both programs require a "capstone" portfolio and/or thesis review. This "practical" application of acquired knowledge and achieved skill is a major source of performance assessment data.

Compared to the Informatics Program, the New Media Program is the older, larger, and (perhaps arguably) the more diverse and numerous in terms of its targeted domains. As a "virtual school" the SOI utilizes faculty and courses from existing departments in the SOI plans of study, especially for the Informatics Program. Currently, both programs assess courses across the board, although this is very much a work in progress.

A) New Assessment Activities

The SOI faculty committee on Assessment was formed in August 2001. The chairperson has become a regular participant in the University Program Review and Assessment Committee (PRAC) during the 2001-2002 school year. Formulation of additional formal assessment provisions is in progress.

B) Continuing Assessment Activities

The SOI faculty committee on Assessment is continuing to develop and integrate assessment activities.

1) Courses (Also) Serving Non-SOI-Majors

Currently, there is no formal assessment process for this category.

2) The A.S. Degree

Currently, there is no formal assessment process for this category.

3) The B.S. Degrees

Students are required to take a pre-assessment skills examination during their NEWM gateway course N100 and N101. At that time, UCOL students receive pre-entry advising, as well as the opportunity to enroll in the informatics first-year experience classes. Students should be able to demonstrate competencies of performance as a measurable outcome by the use of written reports, projects, oral presentations, examinations and quizzes, laboratory reports, and portfolio preparation.

A student is in good academic standing for an Indiana University bachelor's degree when his or her semester grade point average is a minimum of 2.0 (C) for the last semester's course work and his or her cumulative grade point average is at least 2.0 (C). Students must be in good academic sanding to graduate.

The grade for a course will be determined by the course instructor, using the objectives and criteria stated in the course syllabus. Typically, this will involve exercises and examinations which may be written or oral, plus reviews and projects which may be assigned to the student individually or within a group of

students. The successful student will demonstrate understanding of strategic course concepts and their application in tactical contexts.

The senior capstone experience permits an assessment of the extent to which the student can exhibit a general education perspective while demonstrating proficiency in their major and concentration or specialization area.

4) The M.S. Degrees

A student is in good academic standing for an Indiana University bachelor's degree when his or her semester grade point average is a minimum of 3.0 (B) for the last semester's course work and his or her cumulative grade point average is at least 3.0 (B). Only courses with grades of C (2.0) or above may be counted toward degree requirements. However, grades below C are used in computing the cumulative grade point average, even if a course is repeated and a higher grade is earned.

A minimum of a B (3.0) average in graduate work is required for continuance in graduate study.

The grade for a course will be determined by the course instructor, using the objectives and criteria stated in the course syllabus. Typically, this will involve exercises and examinations which may be written or oral, plus reviews and projects which may be assigned to the student individually or within a group of students. The successful student will demonstrate understanding of strategic course concepts and their application in tactical contexts.

The graduate thesis or graduate capstone experience permits an assessment of the extent to which the student can exhibit a general education perspective while demonstrating proficiency in their major and concentration or specialization area.

C) Previous Assessment Activities

The faculty has developed collaborative efforts with other departments such as computer technology and computer science. The School has also developed cross-listed courses with computer science, chemistry, allied health, organizational leadership and supervision, and biology; thereby, maximizing resource effectiveness and minimizing resource redundancy.

IV. Feedback and Response

Fortunately, in this new School, assessment of student learning has been introduced during the infancy of the New Media Program and the Informatics Program. As both programs mature, it is increasingly critical that faculty remain actively engaged in the continuous improvement of student learning and student satisfaction with the learning process.

V. Future Assessment Plans

In the next school year, the SOI faculty committee on Assessment will seek to extend the coverage and consistency of assessment strategy and methods. It will do this by continuing to coordinate closely with other SOI faculty committees, especially the faculty committee on Curriculum and the faculty committee on Technology. In addition, it will remain actively engaged on the IUPUI Planning Review & Assessment Committee[11] (PRAC) and with the many representatives to that committee from other schools from who much already has been learned. In doing so, the committee will formulate and seek acceptance for "improvement through the collection of evaluative data and reflection on the implications of the findings for practice"[12].

[11] http://www.planning.iupui.edu/prac/prac.html
[12] http://www.iport.iupui.edu/OLD%20SITE/pulPreface.htm

VI. Concluding Remarks

"In 1997, colleges and universities in the state of Indiana granted 29,679 baccalaureate degrees. However, in 1998, the U.S. Census Bureau indicated that Indiana ranked 47th of all states in the number of residents over 25 years of age with a baccalaureate degree. This alarming differentiation has been called the 'brain drain.'"[13]

The recent establishment of the Indiana University School of Informatics is one direct response to the "Indiana brain drain" issue. It is an intrinsically interdisciplinary response that seeks to address issues systemically, so that the whole is indeed greater than the sum of its parts. Assessment is a critical component of confidently charting the School's course past the complex challenges of these chaotic times.

[13] http://www.indianaintern.net/about_articles.asp?articleID=32

VII. Glossary

Informatics

> Informatics is the systematic study of scientific, technical, aesthetic, and organizational aspects of computerization, especially how relevant data are managed and informed decisions are made, usually with reference to a specific applied discipline (for examples, Chemical Informatics or Media Informatics). Informatics is a key for discovery of new principles to *inform* our understanding of the world, development of new approaches that *transform* our abilities in the world, and delivery of needed progress to *perform* with the best in the world.

A systematic study allows analysis and improvement of results and reliability. The idea of computers and computerization is widespread if not common knowledge, and is an appropriate icon for the current era of information technology. The aspects of computerization to be studied include the scientific and technical, plus the equally critical aesthetic and organizational, all in appropriate balance.

- Scientific/Business: problem definition
- Technical: solution specification
- Aesthetic: answer communication
- Organizational/Political/Social/Legal/Ethical: questions & change management

The realm between the common definitions of relevant data and informed decisions includes many diverse points of view on information and knowledge; regardless, common expectation is that planned outcomes should be decisive and backed by data.
Informatics is an intrinsic integration among many domains with a focus on a specific applied domain, for example Chemistry or New Media or any major area of knowledge where the hunt for relevant data is needed to achieve the goal of making better/faster/cheaper informed decisions.